Appl. No. 10/804,721
Amdt. dated July 7, 2006
Reply to Office action of April 7, 2006

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (original). A method for steering an agricultural vehicle comprising:

receiving global positioning system (GPS) data including position and velocity

information corresponding to at least one of a position, velocity, and course of said vehicle;.

receiving a yaw rate signal corresponding to a yaw rate of said vehicle;

computing a compensated heading for said vehicle based on an integration of said

yaw rate signal, said compensated heading comprising a blend of said yaw rate signal with

heading information based on said GPS data, wherein said compensated heading is further

dynamically calibrated based on said GPS data;

for each desired swath comprising a plurality of desired positions and desired

headings:

computing an actual track and a cross track error from said desired swath

based on said compensated heading and said position, wherein said position is

compared with a selected desired position of said plurality of desired positions

and said compensated heading is compared with a selected desired heading of said

plurality of desired headings;

calculating a desired radius of curvature to arrive at said desired track with

a desired heading;

generating a steering command based on said desired radius of curvature

to a steering mechanism, said steering mechanism configured to direct said

vehicle.

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Claim 2 (original). The method of Claim 1, further including receiving differential

corrections for said GPS data and correcting said GPS data based on said differential corrections.

Claim 3. The method of Claim 2, wherein said GPS data includes at least one of, carrier phase RTK corrections, a satellite based differential corrections, and ground based differential corrections.

Claim 4 (original). The method of Claim 2, further including utilizing a DGPS system with

dual antennae optimized to generate additional accuracy in said GPS data, further including heading data and generating said compensated heading utilizing said GPS data and said heading data.

Claim 5 (original). The method of Claim 1, further including generating a differential

corrector with a reference DGPS receiver and transmitting said differential corrector to the vehicle.

Claim 6 (original). The method of Claim 1, wherein said dynamic calibration includes at

least one of rate gyro bias error and scale factor error, during operation, and eliminates static

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initialization.

Claim 7 (original). The method of Claim 1, further including generating a tilt angle for said

vehicle based on at least one of a filtered accelerometer signal and roll signal which can be used

to generate a cross track correction based on antenna rotation height to correct for slope induced

error in said cross track error.

Claim 8 (original). The method of Claim 1, further including reducing error in an along

track velocity and position by rotating an east and north velocity from said GPS data into along

track and cross track components using said compensated heading.

Claim 9 (original). The method of Claim 1, where in said calculating includes generating

radius of curvature data, based on best fit algorithms from said GPS data including a current

position, a heading and a speed to a desired aim point and desired heading, said aim point can be

at least one of: on a straight line with parallel guidance; an interpolated point from a point of

closest approach to a previously logged, stored or generated curved track; an edge of previously

traveled swaths; a data file of track points based on best fit algorithms.

Claim 10 (original). The method of Claim 1, wherein said generating a steering command

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includes generating a command to drive a hydraulic or electrically driven steering system of said

vehicle based on a difference between said desired curvature to reach an aim point, a current

speed of said vehicle and a rate of turn of said vehicle.

Claim 11 (original). The method of Claim 1, further including offsetting said

desired line to

match differences in spacing of existing tracks to compensate for spacing errors therein.

Claim 12 (original). The method of Claim 1, further including compensating for

features in

fields with a step in a nominal spacing of parallel guidance lines by offsetting said desired line to

align with a current position.

Claim 13 (original). The method of Claim 1, further including offsetting said

desired line

direction by proportionally adjusting a parallel guidance line from a fixed aim point behind the

vehicle to a point including a small increment offset from a current position.

Claim 14 (original). The method of Claim 1, further including real time

determination of

slope at a current position and application of a swath width adjustment to optimize real ground

coverage to yield correct spacing between swaths and additional ground coverage.

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Claim 15 (original). The method of Claim 13 wherein said determination includes a

database lookup.

Claim 16 (original). The method of Claim 1, further including generating closely spaced A

and B points for a parallel guidance mode to facilitate immediate guidance to a first line, wherein

subsequent single button adjustments allow fine tuning of new B points at small increments

offset from the current position.

Claim 17 (original). The method of Claim 1 wherein said blend includes combination of

said yaw rate signal with said heading information, said yaw rate signal exhibiting high short

term accuracy relative to said heading information, while said heading information exhibits high

long term accuracy relative to said yaw rate signal.

Claim 18 (original). The method of Claim 16 wherein said blend employs Kalman filtering

techniques.

Claim 19 (original). A system for steering an agricultural vehicle comprising:

a means for receiving global positioning system (GPS) data including position

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and velocity information corresponding to at least one of a position, velocity, and course of said

vehicle; a means for receiving a yaw rate signal corresponding to a yaw rate of said vehicle;

a means for computing a compensated heading for said vehicle based on an

integration of said yaw rate signal, said compensated heading comprising a blend of said yaw

rate signal with heading information based on said GPS data, wherein said compensated heading

is further dynamically calibrated based on said GPS data;

for each desired swath comprising a plurality of desired positions and desired

headings:

a means for computing an actual track and a cross track error from said

desired swath based on said compensated heading and said position, wherein said position is

compared with a selected desired position of said plurality of desired positions and said

compensated heading is compared with a selected desired heading of said plurality of desired

headings;

a means for calculating a desired radius of curvature to arrive at said

desired track with a desired heading;

a means for generating a steering command based on said desired radius of

curvature to a steering mechanism, said steering mechanism configured to direct said vehicle.

Claim 20 (original). A storage medium encoded with a machine-readable

computer

program code, wherein said storage medium includes instructions for causing a computer to

implement a method for steering an agricultural vehicle comprising:

receiving global positioning system (GPS) data including position and velocity

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information corresponding to at least one of a position, velocity, and course of said vehicle;.

receiving a yaw rate signal corresponding to a yaw rate of said vehicle;

computing a compensated heading for said vehicle based on an integration of said yaw rate signal, said compensated heading comprising a blend of said yaw rate signal with heading information based on said GPS data, wherein said compensated heading is further dynamically calibrated based on said GPS data;

for each desired swath comprising a plurality of desired positions and desired headings:

computing an actual track and a cross track error from said desired swath based on said compensated heading and said position, wherein said position is compared with a selected desired position of said plurality of desired positions and said compensated heading is compared with a selected desired heading of said plurality of desired headings;

calculating a desired radius of curvature to arrive at said desired track with a desired heading;

generating a steering command based on said desired radius of curvature to a steering mechanism, said steering mechanism configured to direct said vehicle.

Claim 21 (currently amended). A computer system producing a data signal embodied in a computer readable medium:

wherein said computer data signal comprises code configured to cause a computer to implement a method for steering an agricultural vehicle comprising:

receiving global positioning system (GPS) data including position and velocity information corresponding to at least one of a position, velocity, and course of said vehicle;.

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receiving a yaw rate signal corresponding to a yaw rate of said vehicle;

computing a compensated heading for said vehicle based on an integration of said

yaw rate signal, said compensated heading comprising a blend of said yaw rate signal with

heading information based on said GPS data, wherein said compensated heading is further

dynamically calibrated based on said GPS data;

for each desired swath comprising a plurality of desired positions and desired

headings:

computing an actual track and a cross track error from said desired swath

based on said compensated heading and said position, wherein said position is compared with a

selected desired position of said plurality of desired positions and said compensated heading is

compared with a selected desired heading of said plurality of desired headings;

calculating a desired radius of curvature to arrive at said desired track with

a desired heading;

generating a steering command based on said desired radius of curvature

to a steering mechanism, said steering mechanism configured to direct said vehicle.

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